CLAIMS

1. Lock system for a door (11), hatch, etc., especially for motor vehicles (10),

-- with a lock (15) on the door (11) to be actuated by a handle (20);

-- with two electrodes (51, 52) for two capacitative sensors (61, 62) and shielding (53) in the handle (20), the shielding being located between the two electrodes, which generate two spatially separate electrical fields at least for certain periods of time,

-- namely, an inner field (30), generated in the intermediate space (17) between the handle (20) and the vehicle (10) by the one electrode (the inner electrode 51), and

-- an outer field (60), generated between the handle (50) and the outside environment of the vehicle (10) by the other electrode (the outer electrode (52);

-- with an electronic access authorization device, the stationary part (63) of which is installed in the vehicle (10) and electrically connected to the two electrodes (51, 52) of the two sensors (61, 62), whereas the mobile part (60) of the device

is carried by the authorized person;

-- where the one sensor (61) with the inner electrode (51) responds when a human hand arrives in the area of the inner field (50) and initiates a first function in the lock (15) or in the vehicle after a data exchange between the mobile part (64) and the stationary part (63) has been successfully completed; and

-- where the other sensor (62) with the outer electrode (52) becomes active when the hand arrives in the outer field (60) within a certain defined minimum distance from the handle (20) and then initiates a second function in the lock (15) or in the vehicle,

characterized in that

-- three circuit board parts provided with conductive traces (44, 45, 46) are connected to each other by film hinges (37, 38); in that

-- the inner electrode (51) is mounted on the first, the outer electrode (52) on the second, and the shielding (53) on the third circuit board part; in that

-- the three circuit board parts can be converted from a large, flat, spread-out condition, allowing the production of

the two electrodes (51, 52) and the shielding (53), to a compact, collapsed condition by folding them together into a three-layer folded product (40); and in that

-- the finished folded product (40) forms a unit (30), which is integrated as a single structural unit into the handle (20).

2. Lock system according to Claim 1, characterized in that, for its first function, the lock (15) is switched to its release position and for its second function to its locking position; and in that

-- as a result, the one sensor (61) functions as the opening sensor and the other (62) as the locking sensor.

3. Lock system according to Claim 1 or Claim 2, characterized in that, in the finished, folded product (40), the three circuit board parts rest on each other over essentially their entire surface areas.

4. Lock system according to one of Claims 1-3, characterized in that the three circuit board parts are designed as a single piece consisting of the three adjacent sections (31, 32, 33) of the overall circuit board (35); and in that

-- the overall circuit board (35) is divided into three

sections (31, 32, 33) by foldable film hinges (37, 38).

5. Lock system according to Claim 4, characterized in that at least one conductive trace (44, 45) passes across at least one of the film hinges (38, 37) and connects two or all three sections (31, 32, 33) of the folded product (40) to each other electrically.

6. Lock system according to Claim 4 or Claim 5, characterized in that the overall circuit board (35) has two linear film hinges (37, 38),

-- which are parallel to each other and divide the overall circuit board (35) into three strip-like sections (31, 32, 33).

7. Lock system according to one of Claims 1-6, characterized in that the overall circuit board (35) or the circuit board parts consist of a flexible leaf; and in that

-- when the folded product (40) is being installed, the flexible leaf is able to bend (67) to conform to the curvature (66) of the handle (20).

8. Lock system according to one of Claims 1-6, characterized in that the conductive traces (44, 45, 46) and/or the conductive areas (41, 42, 43) of the inner electrode (51), of the outer electrode (52), and of the shielding (53) are

located on the same flat side (36) of the overall circuit board (35) or leaf.

9. Lock system according to one of Claims 1-8, characterized in that the conductive areas (41, 42, 43) of the inner electrode (51), of the outer electrode (52), and/or of the shielding (53) cover the entire surface.

10. Lock system according to one of Claims 1-8, characterized in that the conductive areas (41, 42, 43) of the inner electrode (51), of the outer electrode (52), and/or of the shielding (53) are produced in the form of a grid of conductive traces.

11. Lock system according to one of Claims 1-8, characterized in that the conductive areas (41, 42, 43) of the inner electrode (51), of the outer electrode (52), and/or of the shielding (53) are made out of conductive traces of any desired geometric pattern.

12. Lock system according to one or more of Claims 1-11, characterized in that the conductive traces (44, 45, 46) and the conductive areas (41, 42, 43) of the electrodes (51, 52) and of the shielding (53) are produced on the overall circuit board (35) or the leaf by a MID technique (Molded Interconnect

Device).

13. Lock system according to one or more of Claims 1-11, characterized in that the conductive traces (44, 45, 46) and the conductive areas (41, 42, 43) of the electrodes (51, 52) and of the shielding (53) on the overall circuit board (35) or on the leaf are produced by hot foil stamping.

14. Lock system according to one or more of Claims 1-11, characterized in that the conductive traces (44, 45, 46) and the conductive areas (41, 42, 43) of the electrodes (51, 52) and of the shielding (53) on the overall circuit board or on the leaf are produced by a two-component injection-molding technique.

15. Lock system according to one or more of Claims 1-14, characterized in that the individual layers of the finished folded product (40) are held together by snap connections (27, 28).

16. Lock system according to Claim 15, characterized in that the snap connections consist of two connecting halves (27, 28), which are designed as integral parts of the circuit boards or sections (32, 33) of the overall circuit board (35).

17. Lock system according to Claim 16, characterized in that the one half of the connection consists of a projecting

hook (27), whereas the other consists of a hole (28) in the circuit board part or in a section (32) of the overall circuit board (35); and in that

-- the hook (27) is flexible and, in the finished product, is not only aligned with the hole (28) but also engaged with the hole (28) to produce an effective retaining action.

18. Lock system according to one or more of Claims 1-17, characterized in that the overall circuit board (35) or leaf has a fourth section (34), which serves as a carrier for electrical components (48); and in that

-- the electrically conductive traces (44, 45, 46) of at least one of the other sections (31, 32, 33) of the folded product (40) are electrically connected to these components.

19. Lock system according to Claim 18, characterized in that, although the fourth section (34) is designed as an extension of one of the three sections (33) belonging to the folded product (40), it lies outside the folded area (39).

20. Lock system according to Claim 18 or Claim 19, characterized in that the electrical components (48) mounted on the fourth section (34) are used to evaluate the data (65) exchanged between the mobile part (64) and the stationary part

(63) of the access authorization device.

21. Lock system according to Claim 18, Claim 19, or Claim 20, characterized in that the components (48) mounted on the fourth section (34) comprise at least some elements which serve to switch the lock (15) and/or actuators in the vehicle between a first and a second function.

22. Lock system according to Claim 18, Claim 19, Claim 20, or Claim 21, characterized in that the electrical components (48) provided on the fourth section (34) include at least some of the transmitting and/or receiving elements (63), which are used for the data exchange (65) between the mobile part (64) and the stationary part of the access authorization device.

23. Lock system according to one of Claims 1-22, characterized in that the fourth section (34) provided with the electrical components (48) is a component of the preassembled unit (30), which is inserted into a cavity (23) in the handle.

24. Lock system according to one of Claims 1-22, characterized in that the fourth section (34) provided with the electrical components (48) is a component of the preassembled unit (30), which is laid as an insert into the injection mold for the injection-molding of the handle (20) and is enclosed on

all sides by the injection-molding compound during the molding process,

-- where the unit (30) is provided with projecting electrical cables (58) or electrical contacts (59), which project out from the injection-molding compound.